

# Global Action to Control Global Warming

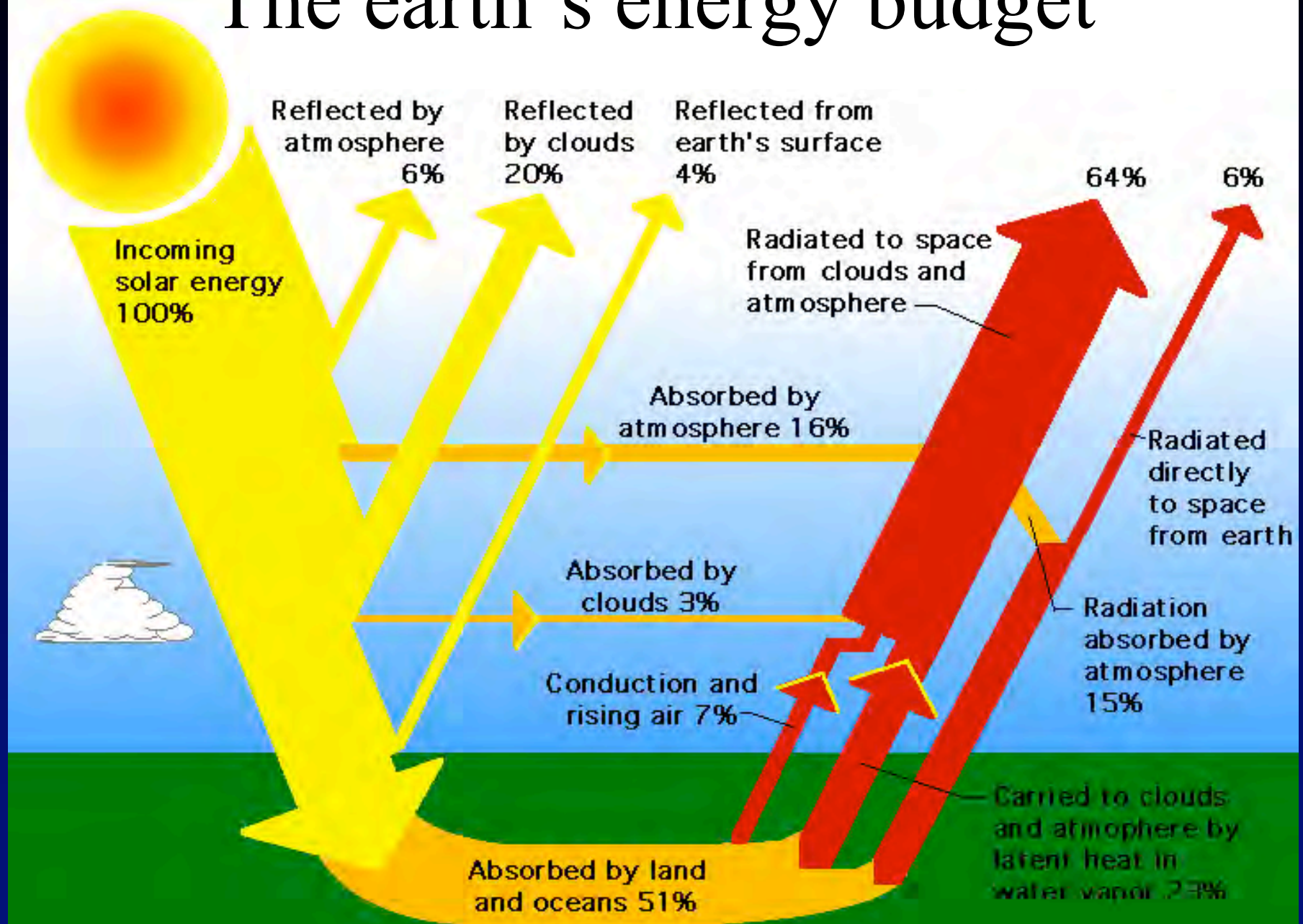
Sir David King

Chief Scientific Adviser to HM Government

Second Annual Climate Change Research  
Conference, West Coast Governor's Global  
Warming Initiative

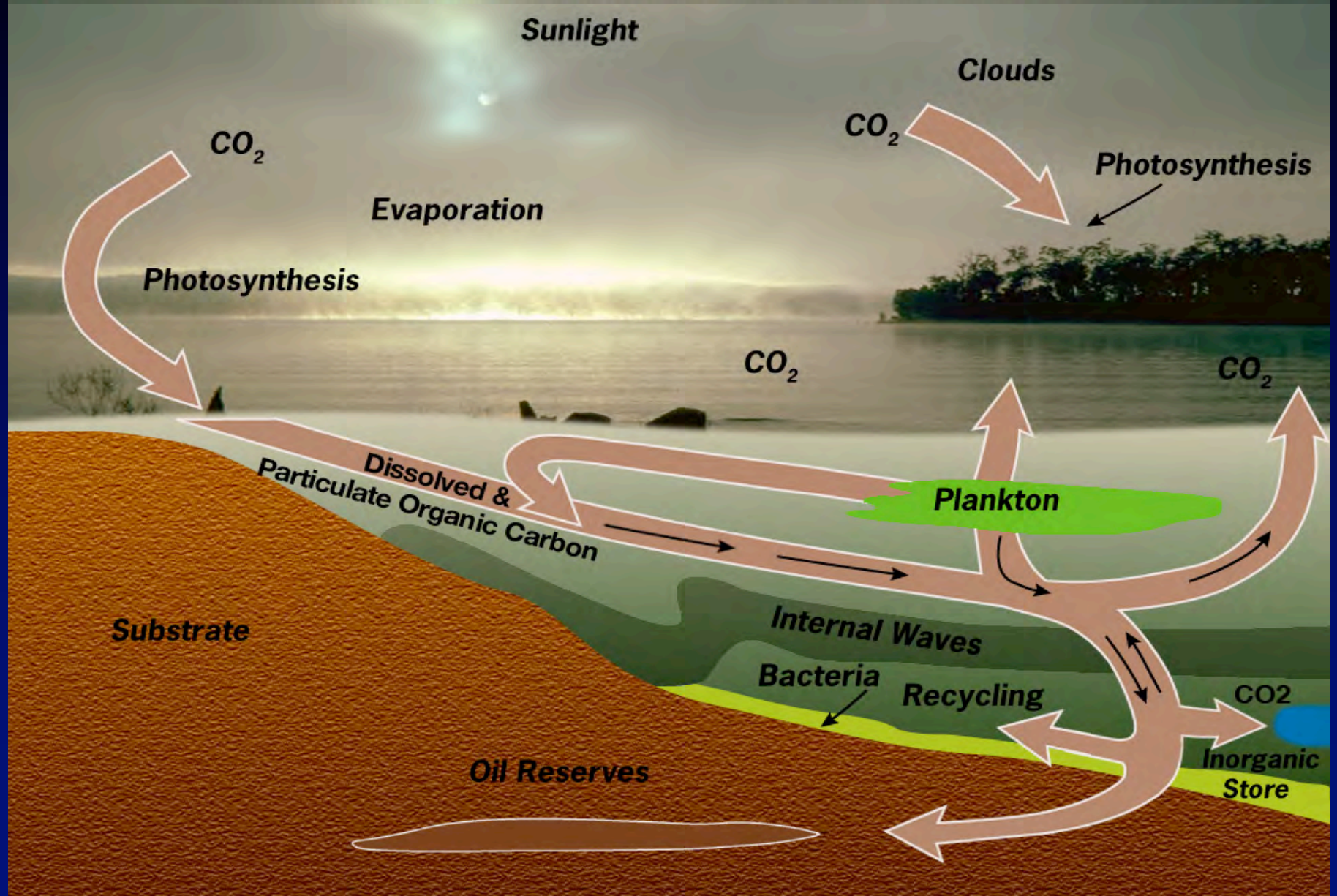
15<sup>th</sup> September 2005

# The earth's energy budget

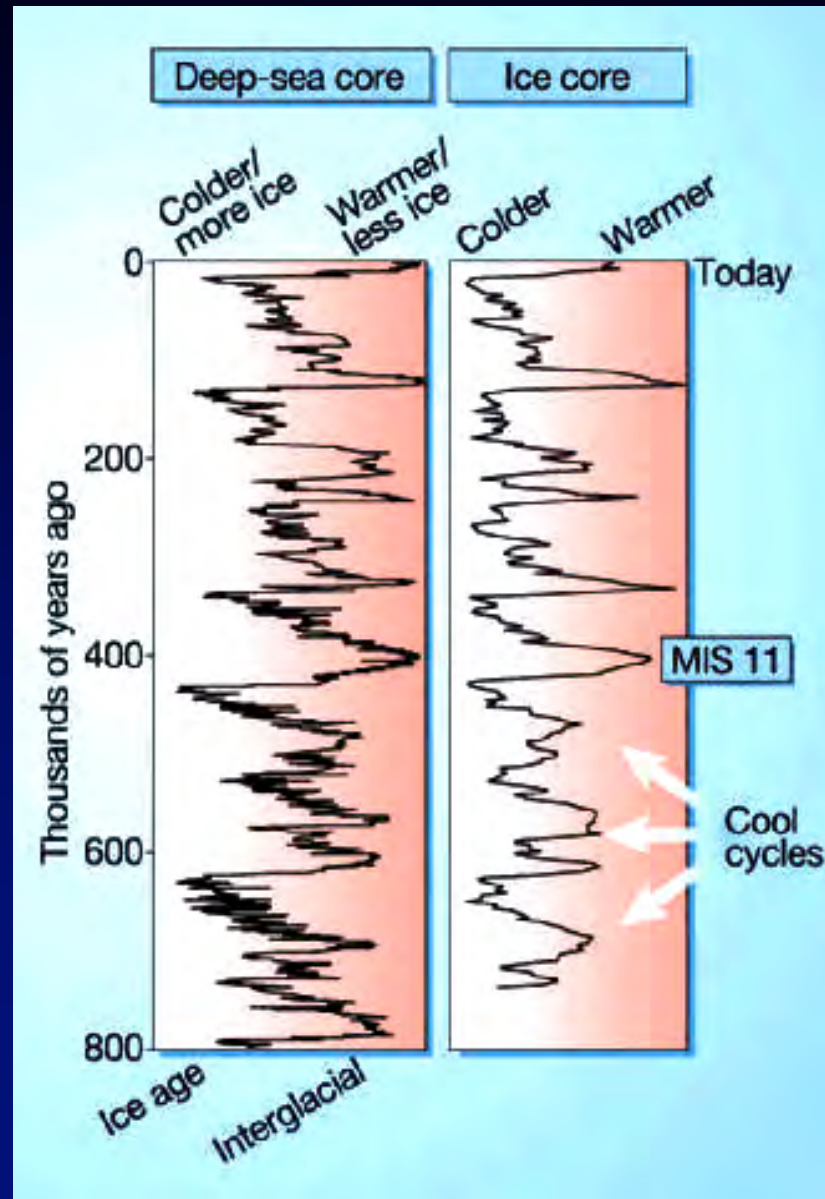


Source: NASA

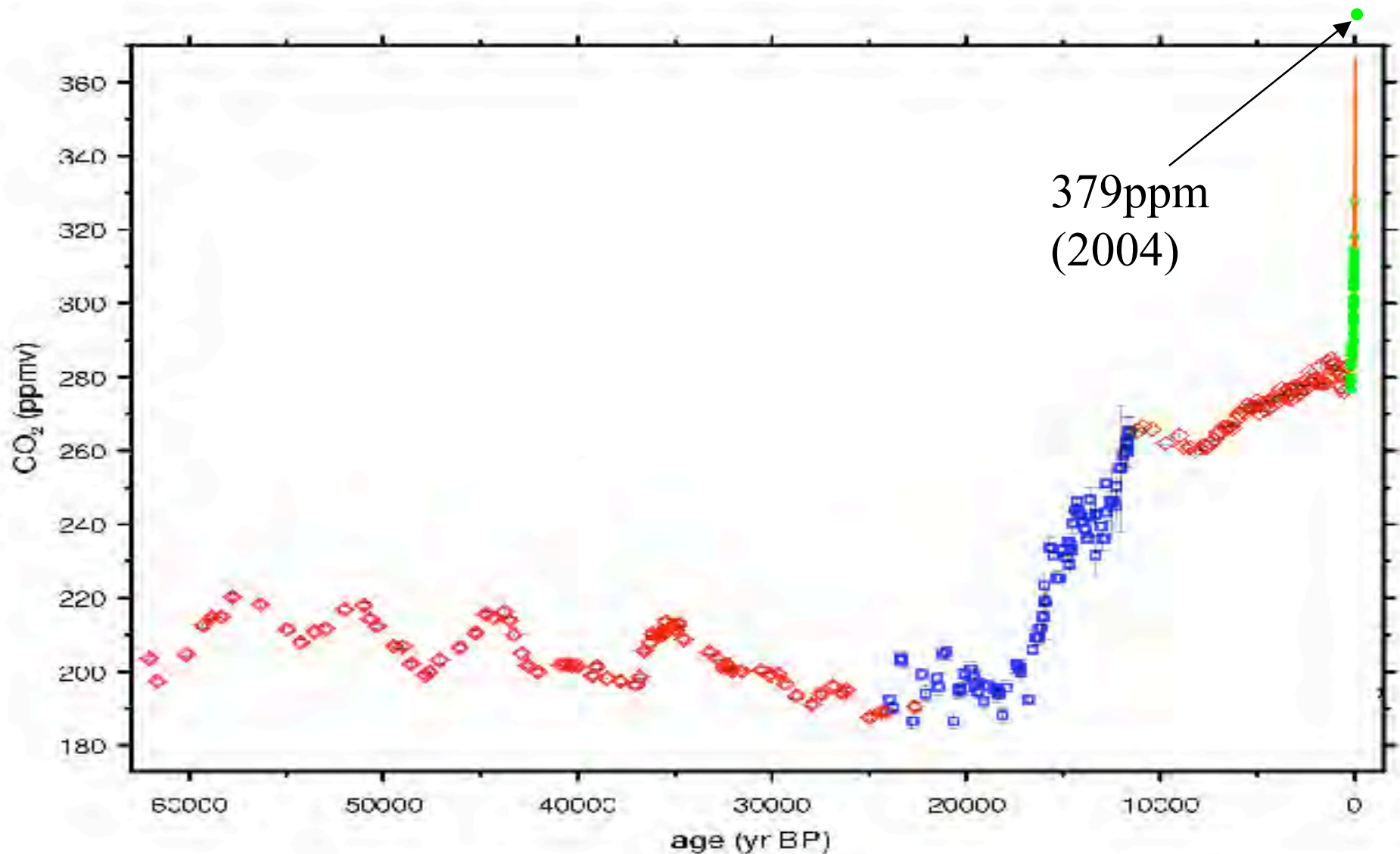
# Carbon cycles



# Glacial cycles of past 800,000 years

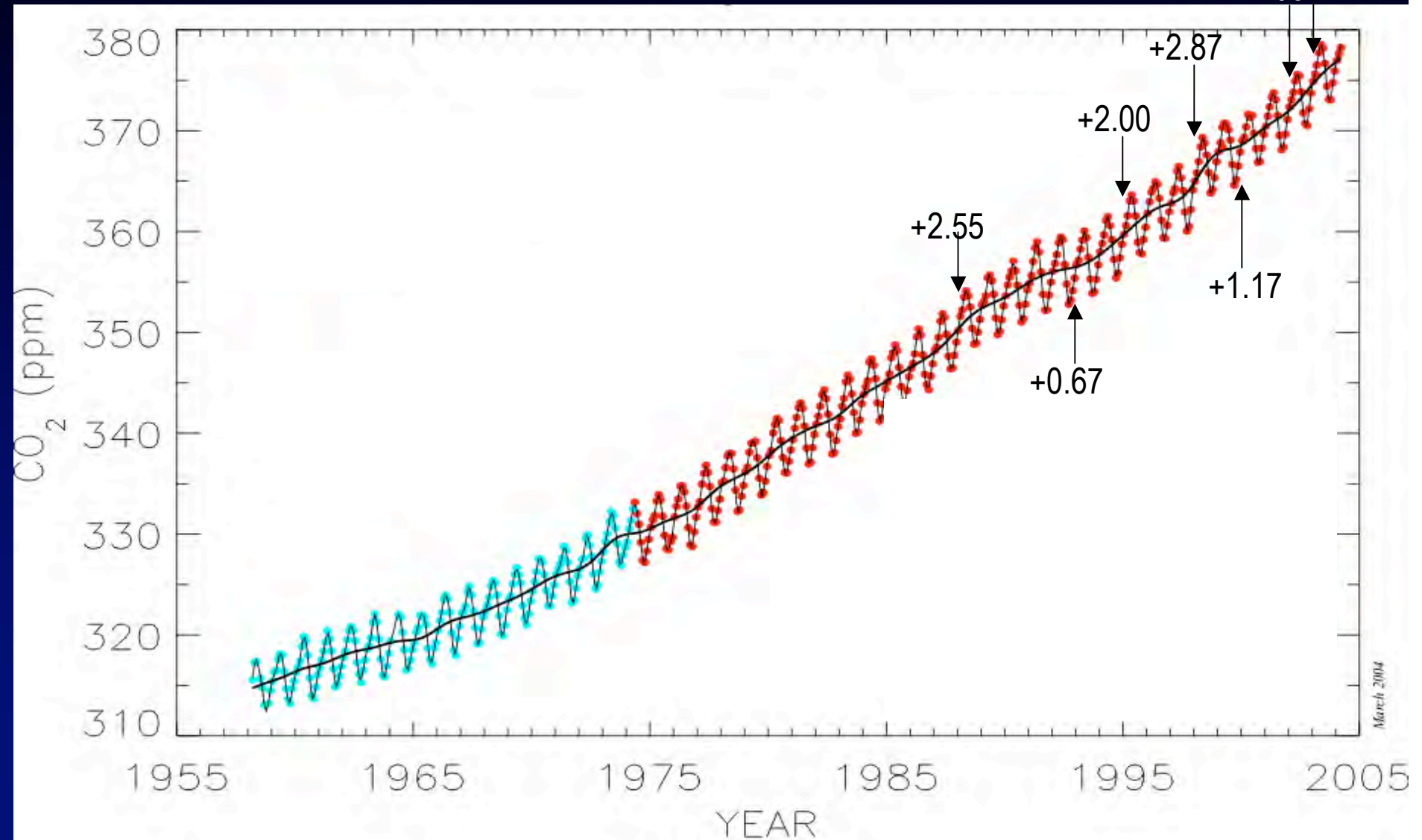


# Carbon dioxide levels over the last 60,000 years



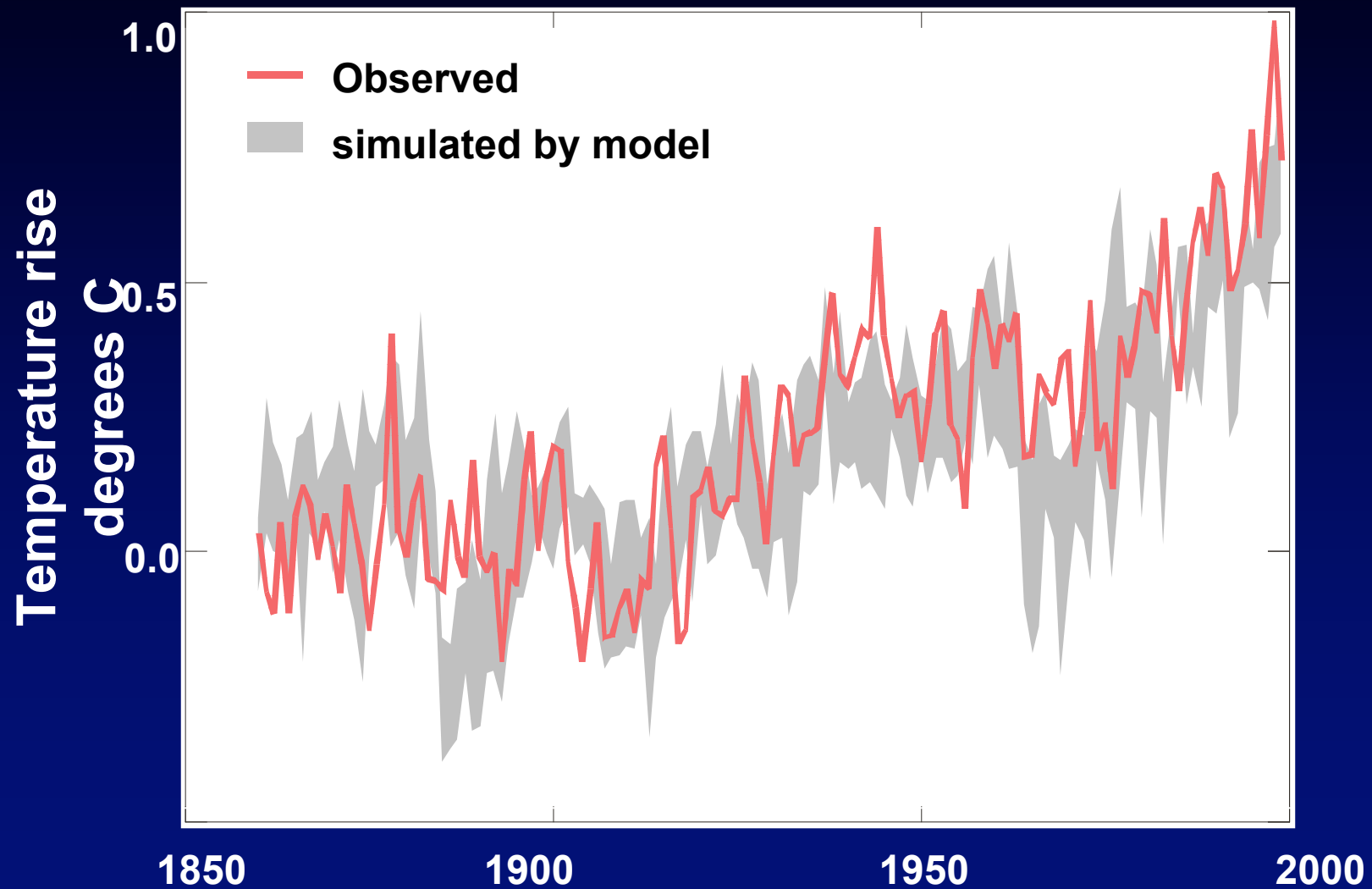
Source University of Berne and National Oceanic and Atmospheric Administration

# The latest data: Mauna Loa monthly mean CO<sub>2</sub> levels

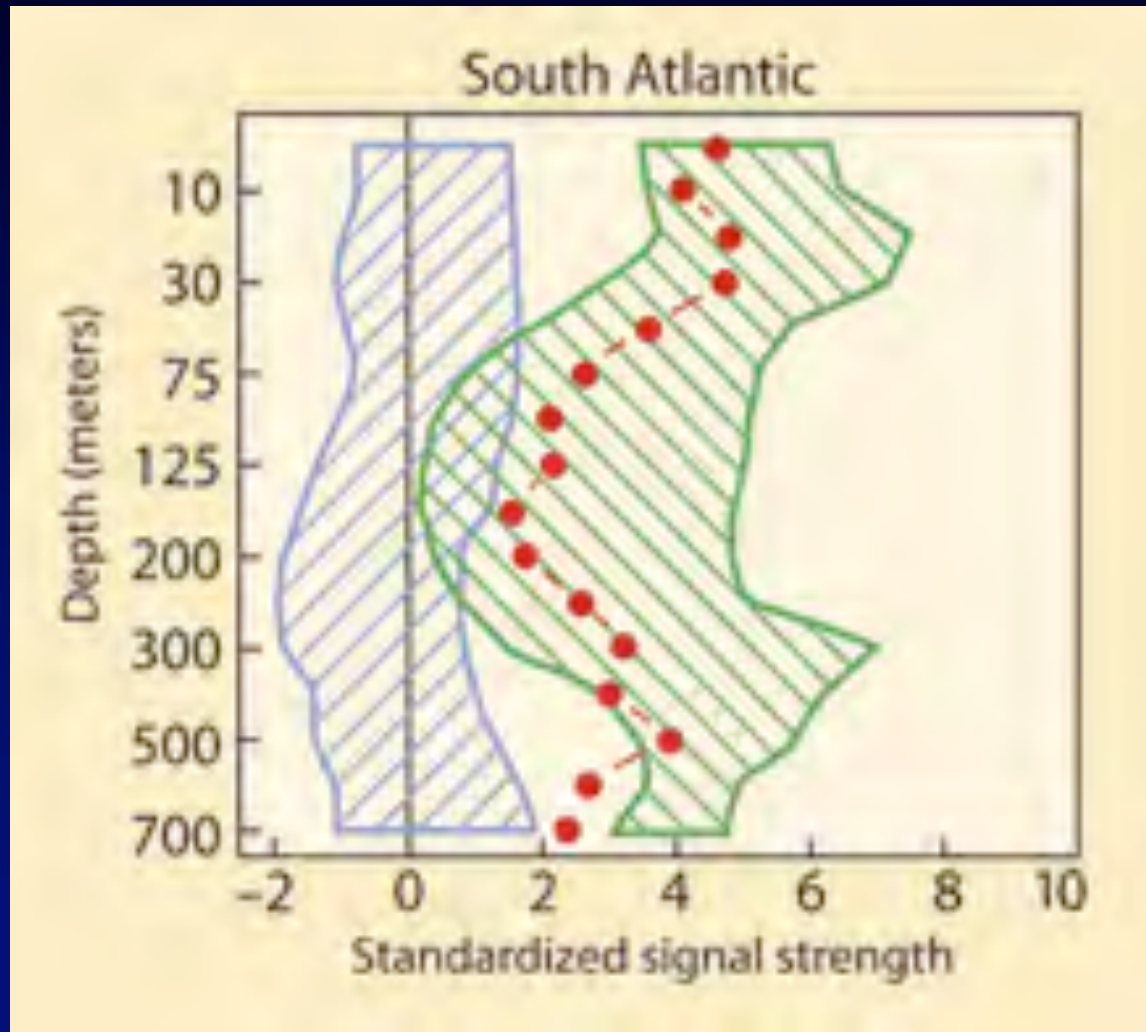


Source: National Oceanic and Atmospheric Administration (NOAA), Climate Monitoring and Diagnostics Laboratory (CMDL), Carbon Cycle

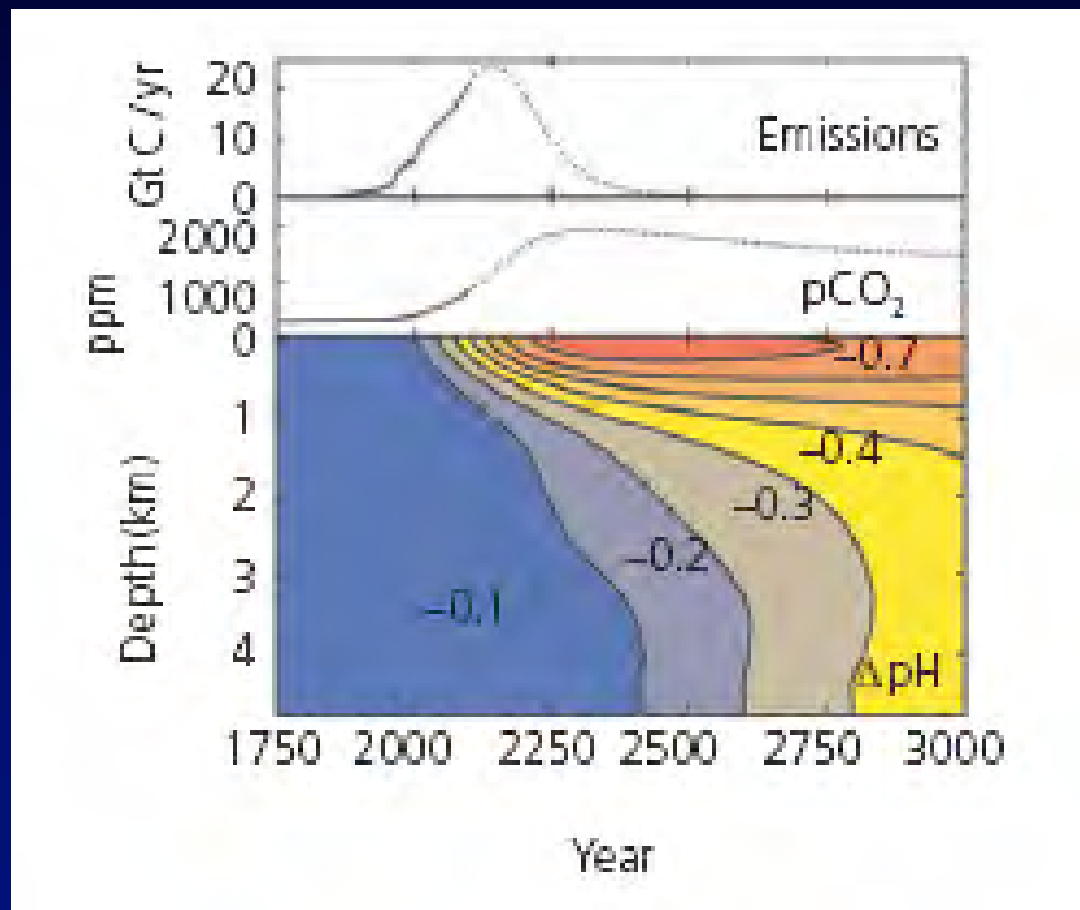
# Simulated global warming



# Ocean warming modelling and observations

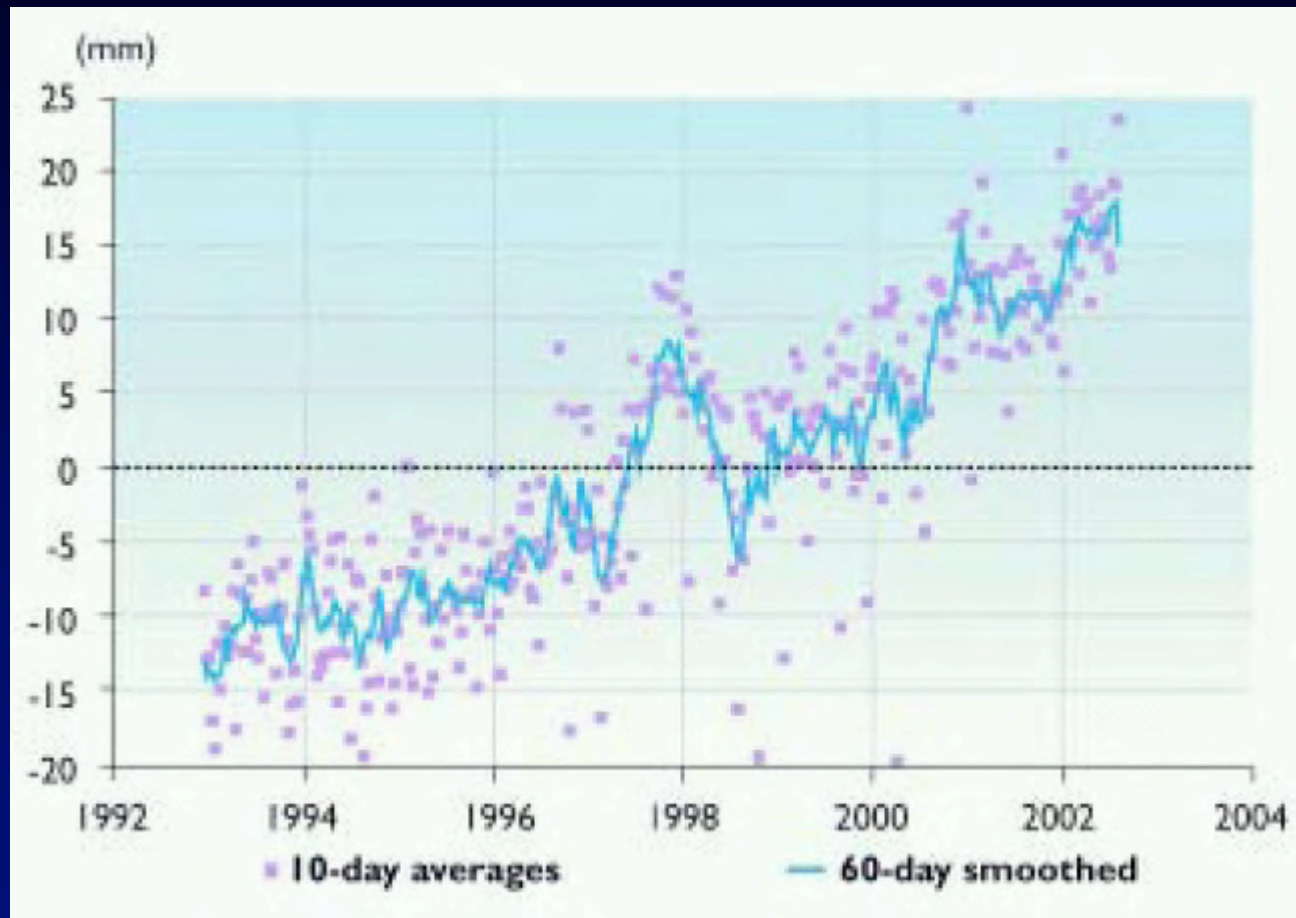


# Projected change in pH of the oceans due to release of CO<sub>2</sub> from human activities



Source: Royal Society Report on the Acidification of Oceans

# Observed Global Sea Level Rise



These data, from a satellite launched in 1992, show the rise in global average sea level over the last decade

Source: Arctic Climate Impact Assessment 2004

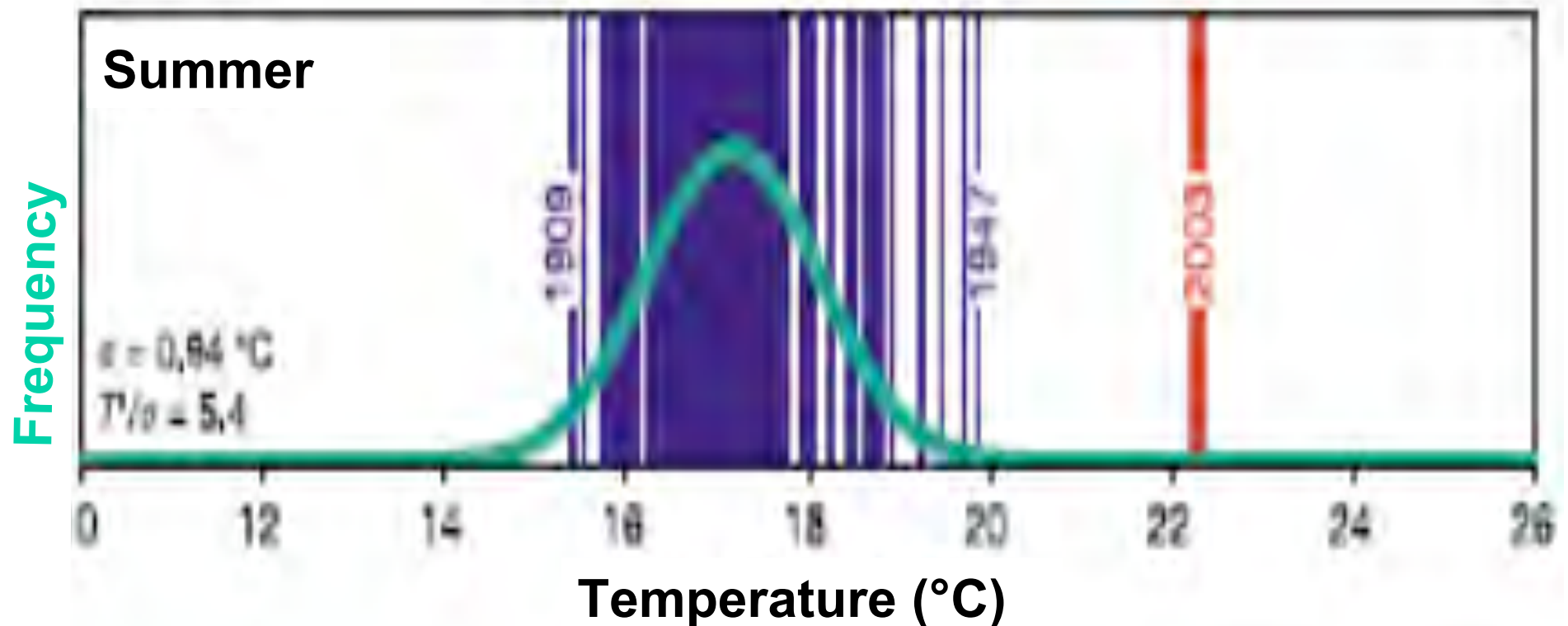
# The impacts of extreme weather events ...

- UK flooding – Boscastle 2004
  - £50m early estimate of costs
- European heatwave 2003
  - ~30,000 deaths
  - \$13.5bn direct costs
- European floods 2002
  - 37 deaths
  - \$16bn direct costs
- UK floods, autumn 2000
  - Insurance pay-out £1bn

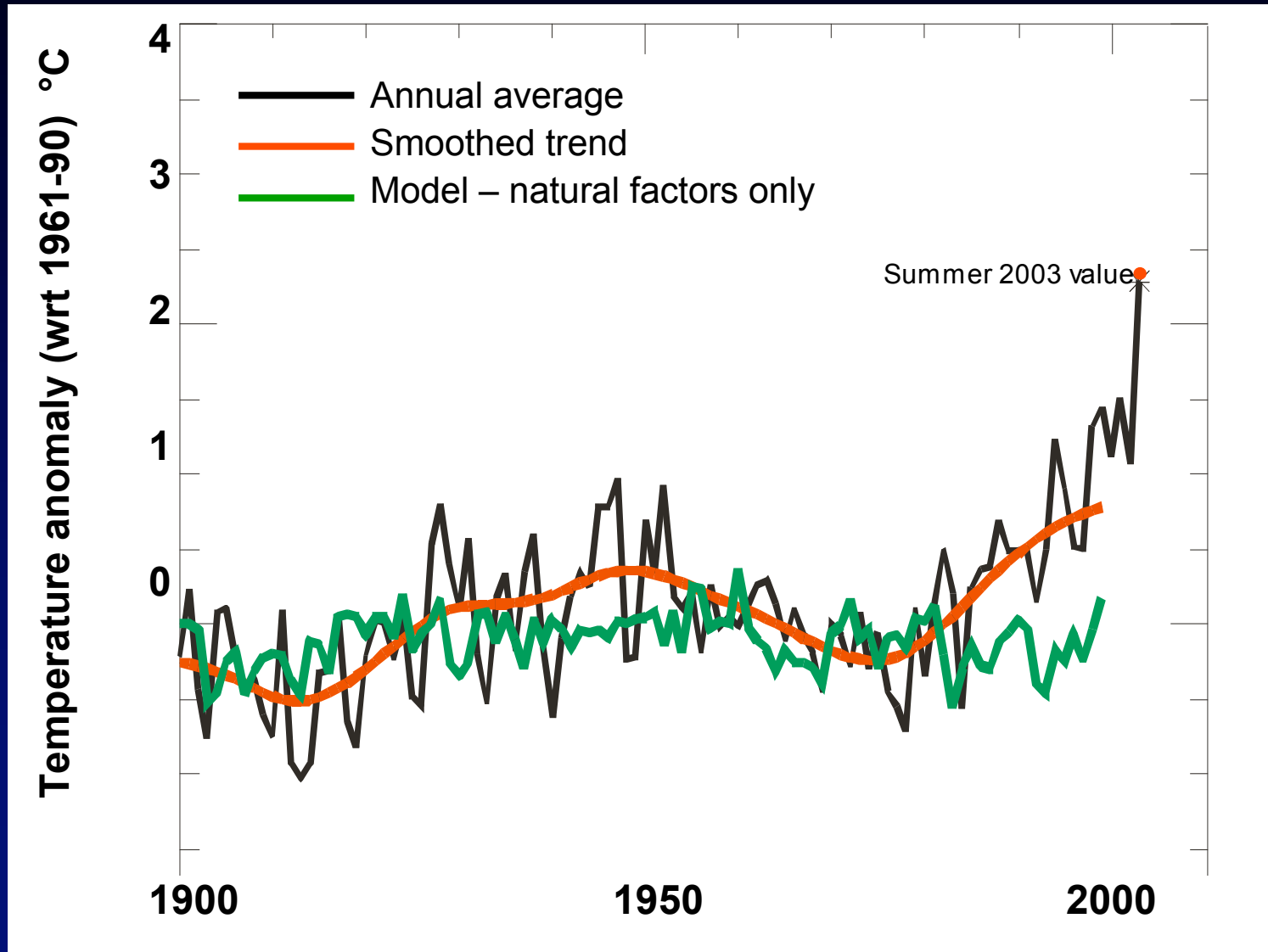


# Are these changes “natural”?

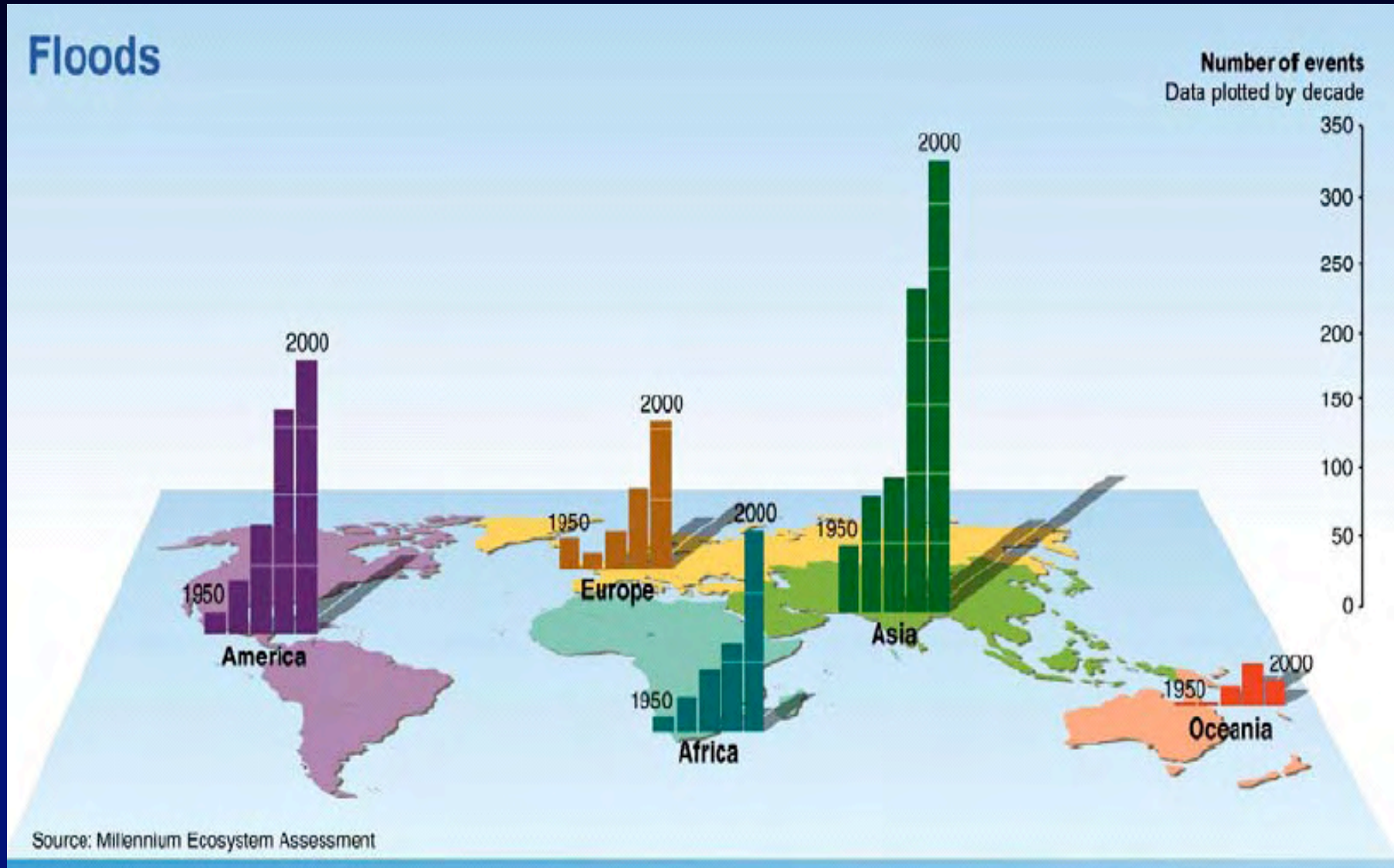
Distribution of seasonal summer temperatures 1864-2003



# Annual European summer temperatures

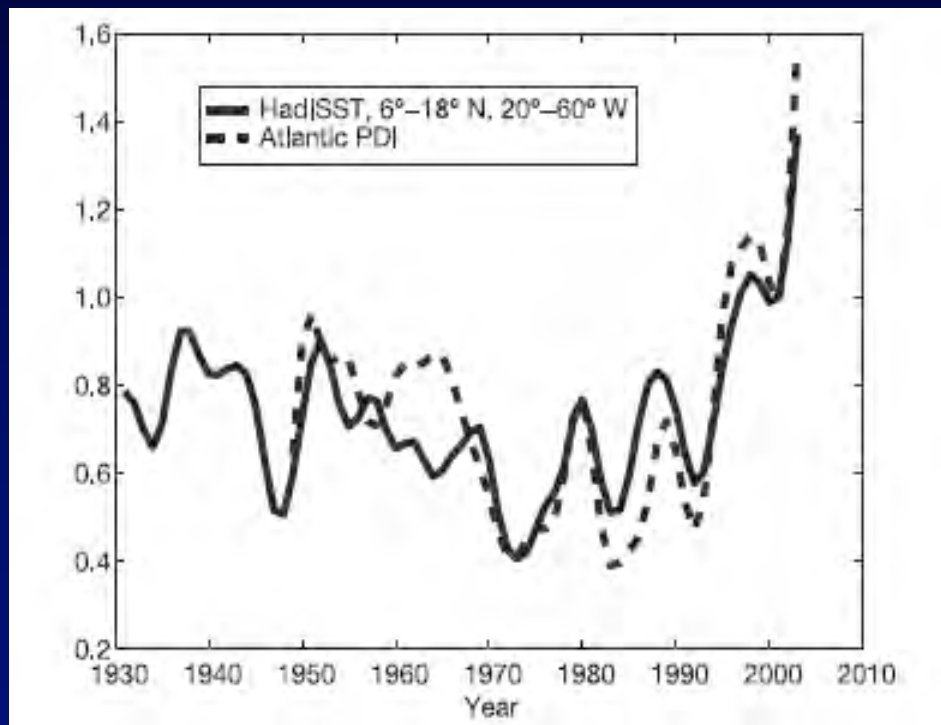


# Number of floods events by continent and decade since 1950

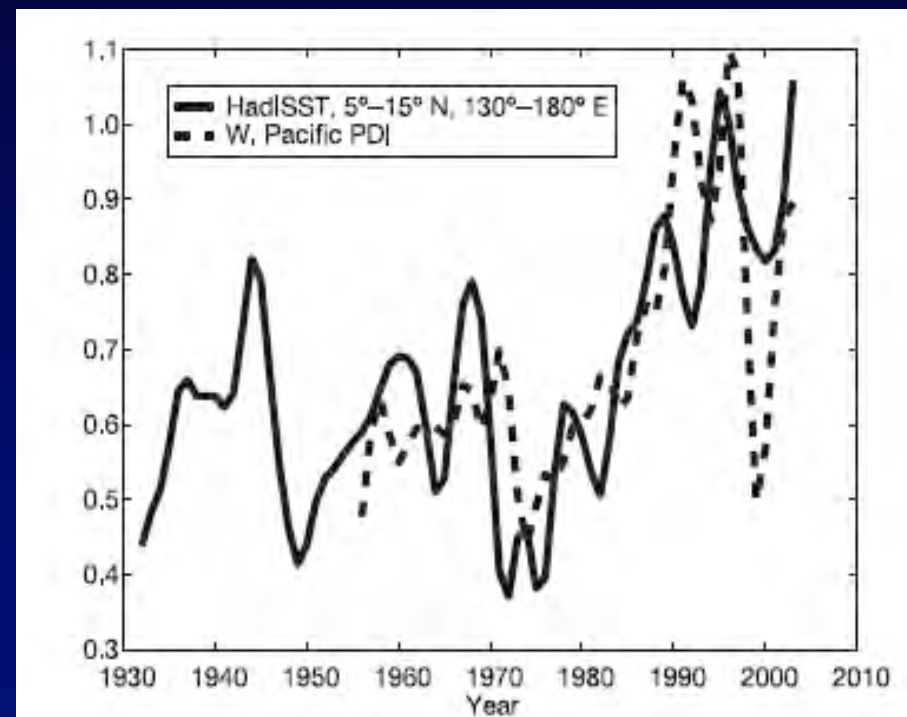


# Increasing destructiveness of tropical cyclones over the past 30 years

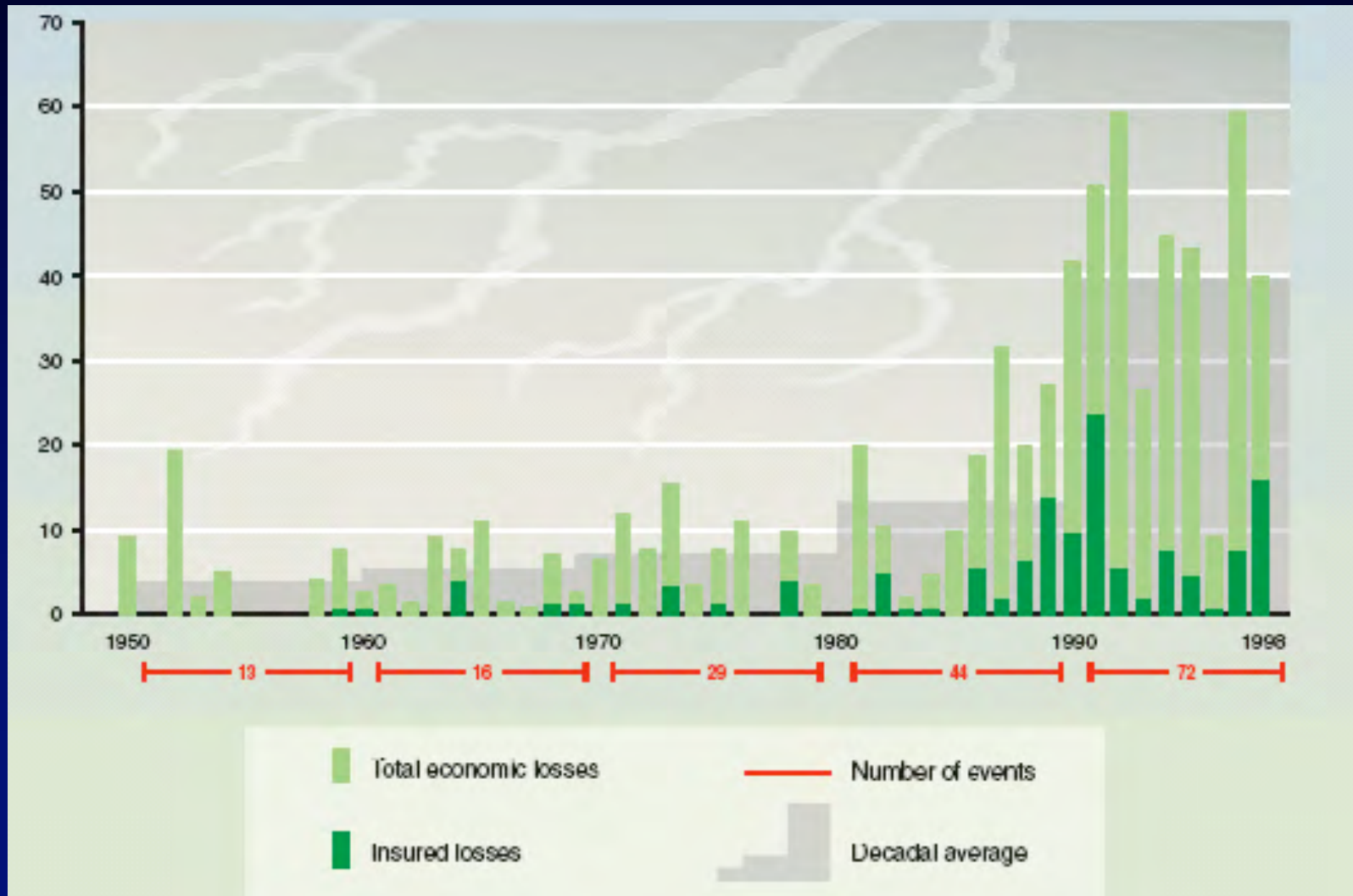
## North Atlantic



## North Pacific



# Global costs of extreme weather events (inflation-adjusted)



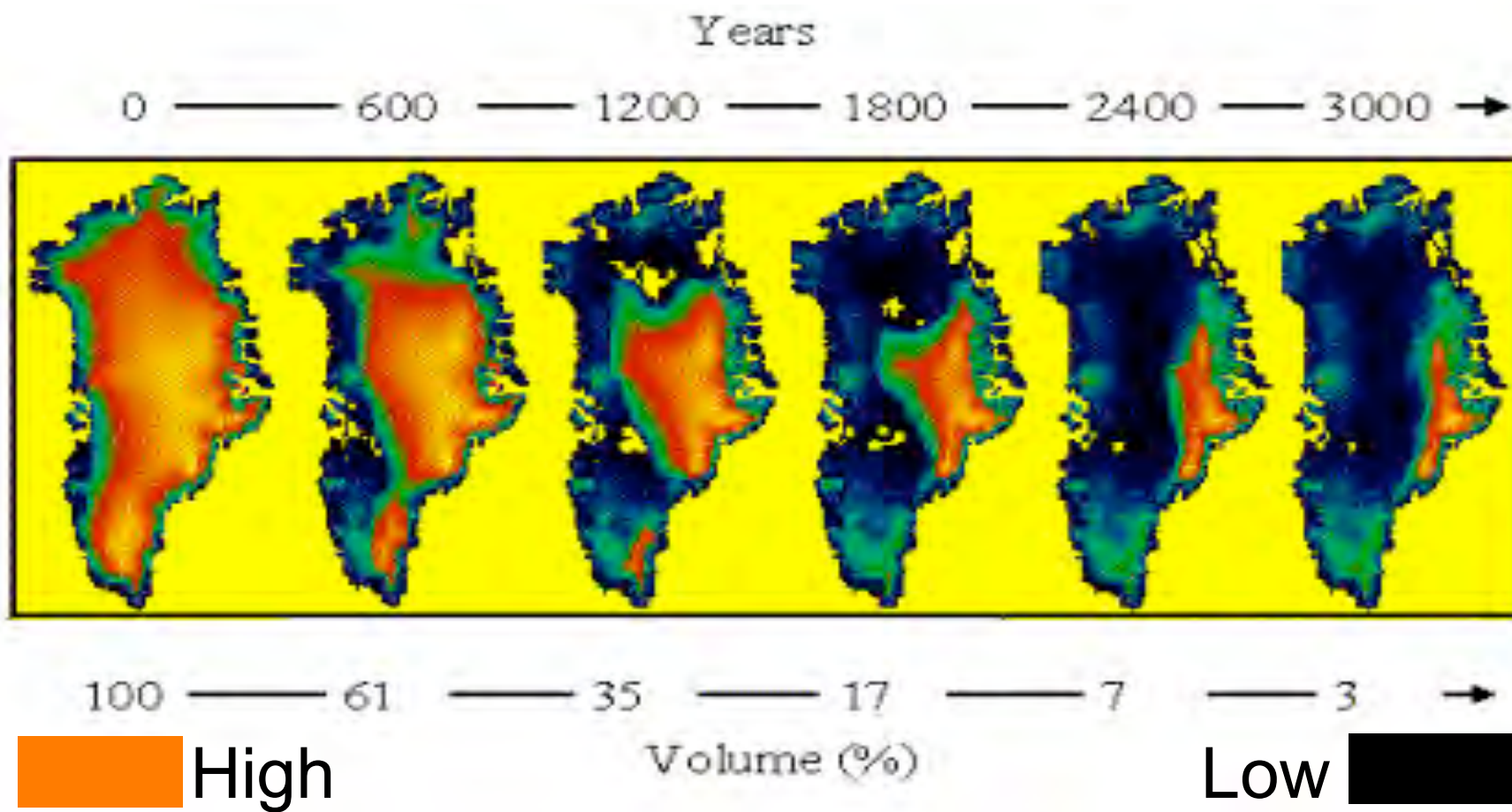
Source: IPCC, 2001

# Extent of ice melt in Greenland, 1992 and 2002



Source: Arctic Climate Impact Assessment 2004

# Greenland ice sheet



# Adapt and Mitigate

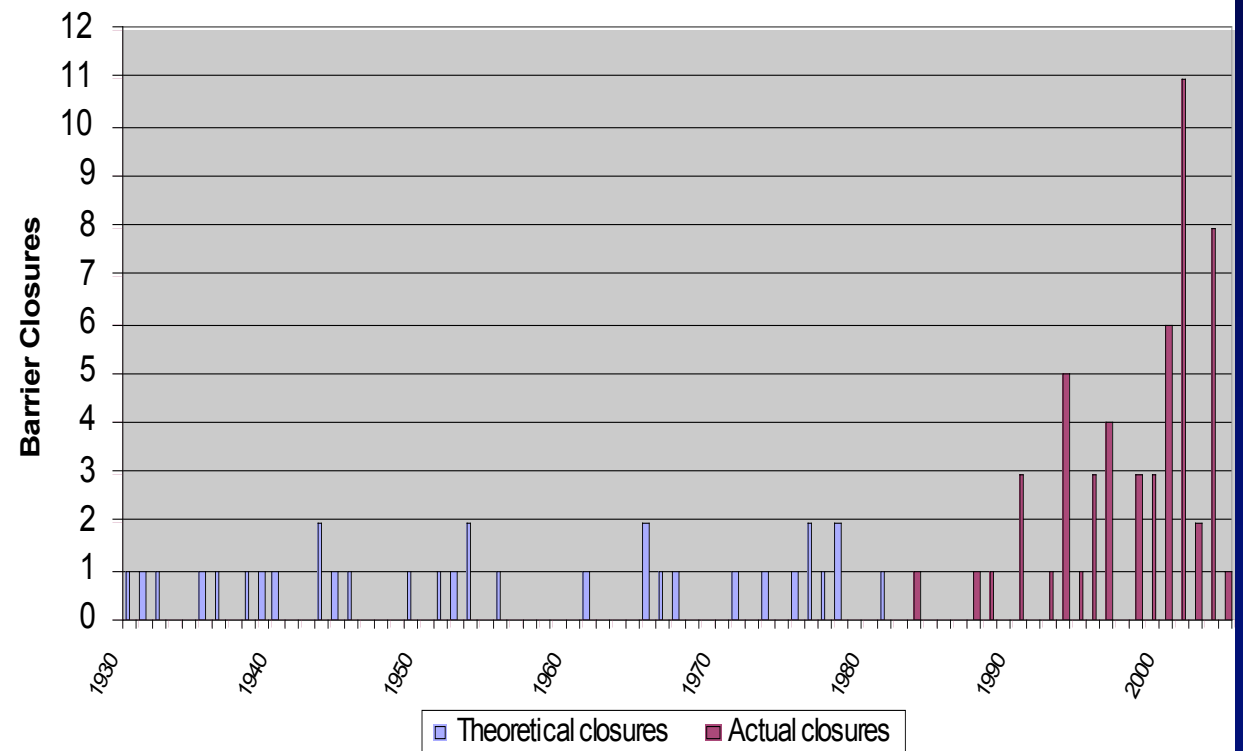
- We must adapt in preparation for the significant changes ahead and manage the risks country by country.
- We have to actively mitigate against the production of greenhouse gases by switching to low carbon energy sources
- And have Foresight....



## The Thames Barrier

Source: Highway57

### Thames Barrier closures 1982-2004



# Possible flooding in the UK by 2080s

Best case scenario



Worst case scenario



SOURCE: DTI Foresight Project

Change in risk of flooding damage (from 2004)

Decrease

Negligible

Low increase

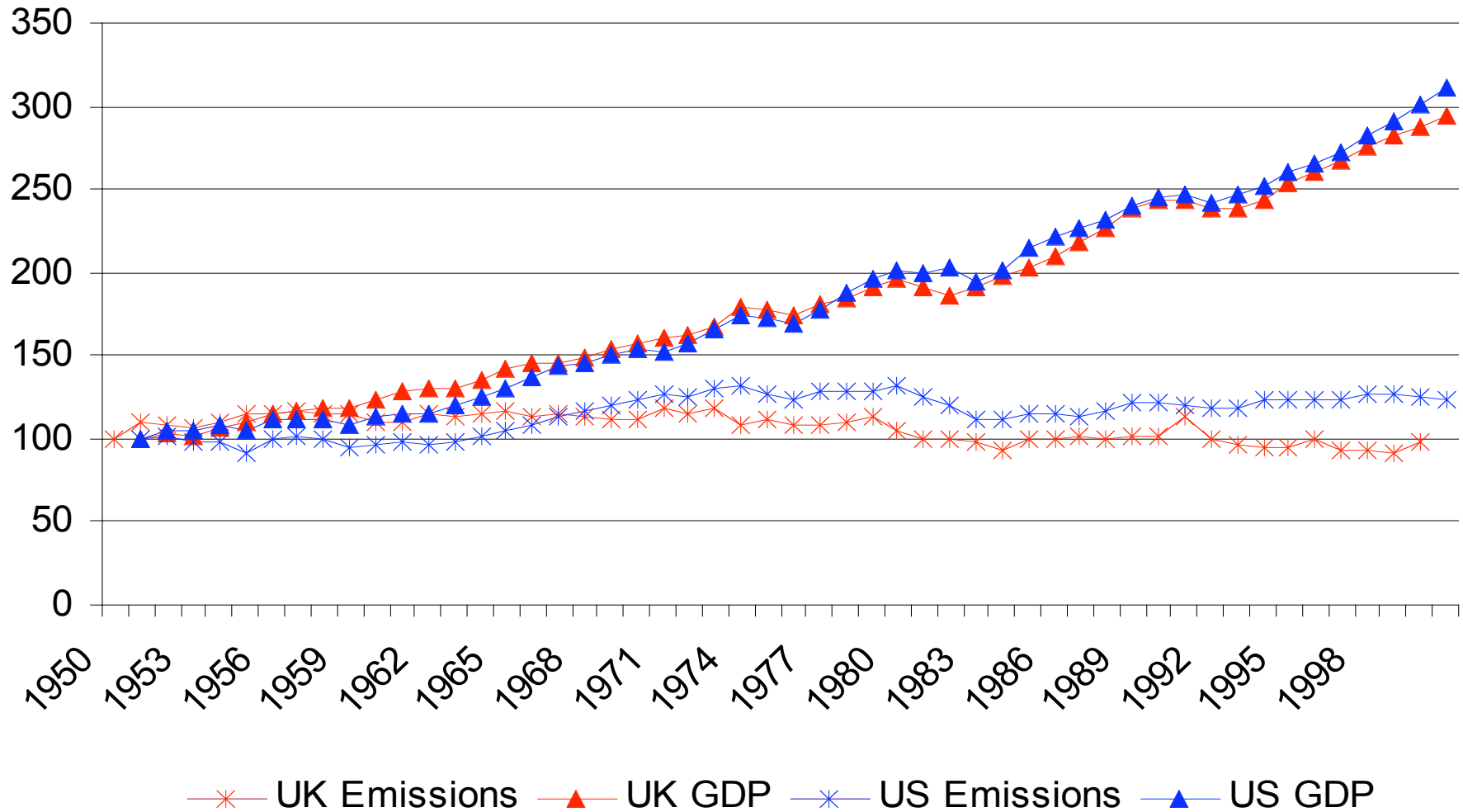
Medium increase

High increase

# Energy Efficiency

- Energy efficiency as the most cost-effective way to meet all of our energy policy goals
- Need strong consistent action from Government
- Through fiscal incentives, leadership awareness-raising and education
- Coupled with effective market-facing support programmes

# GDP and emissions

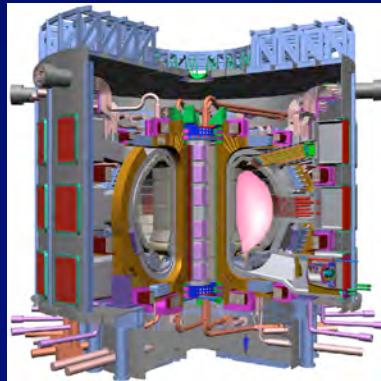
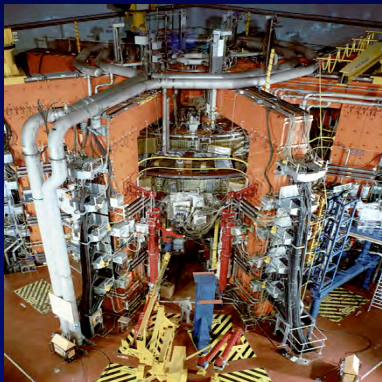


Sources: Penn World Tables and ORNL

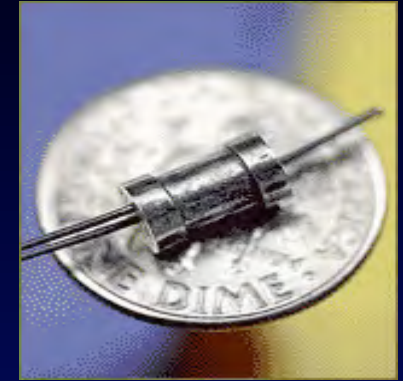
# Energy consumption

- Demand is driven by population growth, economic growth and technological developments.
- World population is projected to grow from 6 billion people today to 9 billion in 2050, with most of the growth occurring in developing countries.
- By 2025 our demand for primary energy is expected to rise by over 50% whilst our demand for electricity will almost double over the same period.

Improved energy  
efficiency...



...and a diverse mix of  
renewables



# Carbon Capture and Storage (CCS)

- CCS will be one of the portfolio of measures aimed at achieving CO<sub>2</sub> reduction targets

Depleted oil fields	125Gt CO <sub>2</sub>
Depleted gas fields	800Gt CO <sub>2</sub>
Deep saline aquifers	400-10000Gt CO <sub>2</sub>
Unmineable coal seams	148Gt CO <sub>2</sub>

# Global Action

- IPCC
- United Nations Framework Convention on climate change
- Kyoto
- UK Government's 60% target
- EU
- G8+5
- Asia/Pacific partnership
- Emissions trading

# Kyoto's first period quantified commitments

Region	Percentage reduction from 1990 levels
EU	-8
USA	-7
Japan	-6
Canada	-6
Australia	+8
Russia and Ukraine	0

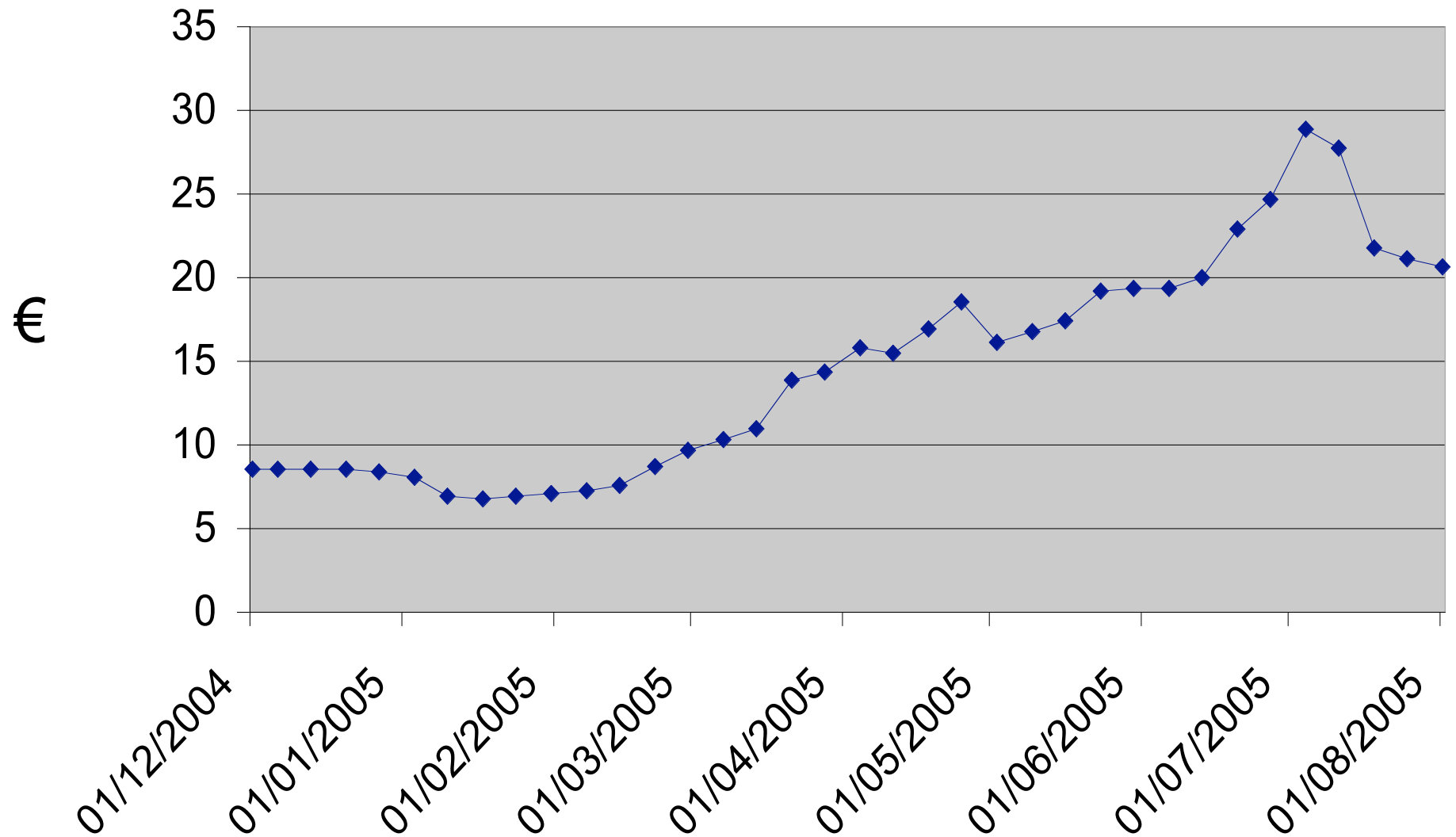
# G8 Follow up

- The first meeting of the Dialogue agreed at Gleneagles will be on the 1<sup>st</sup> November in London
- Will address strategic challenge of transforming our energy systems to create a secure and sustainable energy future
- monitor implementation of the Gleneagles Plan of Action and exploring how to build on this progress

# Montreal - COP 11

- The UK Presidency will strive to represent the EU in a constructive and effective way at the first Meeting of the Parties (MOP) to the Kyoto Protocol, at Montreal in December thus contributing to a successful conference.
- Would like Parties to start a dialogue to address what action to take after 2012,
- We also hope to formally adopt the Marrakech Accords

# Carbon Dioxide price per tonne



Source: Point Carbon

# Market mechanisms

CO<sub>2</sub>

- Emissions trading
- Carbon taxes
- Long-term carbon contracts

Security of  
Supply

- Storage Incentives
- Network margins
- Capacity markets

Technology  
transfer

- Aiding developing countries
- Wealth Creation
- Sharing expertise

“We will act with resolve and urgency now to meet our shared and multiple objectives of reducing greenhouse gas emissions, improving the global environment, enhancing energy security and cutting air pollution in conjunction with our vigorous efforts to reduce poverty”

G8 Communiqué, Gleneagles 2005